



PLAINVIEW

Quarterly newsletter for AWPM for Wheat

AWPM for Wheat is a pest management program for greenbugs and Russian Wheat aphids

Volume 1, Issue 3

Spring 2003

Right: Searching for aphids in the Texas panhandle. Check out information from Texas A & M in our summer newsletter.



Inside this issue:

DNA Analysis
1

Project Team: OSU
2

What's Happening Around
3

Points of Interest
4

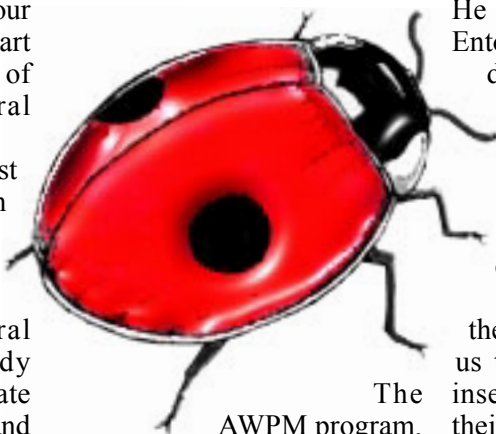
DNA Analysis helps determine how insects adapt

Examining the gut contents of certain insects helps us understand the interaction of aphids, their predators and your crops. This is an integral part of understanding movement of aphids and their natural enemies.

USDA-ARS Entomologist Kevin Shufran participates in the AWPM for Wheat program primarily for this purpose. By understanding what is eaten by natural enemies, such as the lady beetle, Kevin can investigate how these insects both vary and adapt from crop to crop.

Kevin's area of expertise resides in his knowledge of insect ecology and molecular genetics; this also includes

aphid and natural enemy movement among crops and non-crop hosts.



The AWPM program, funded by the USDA-ARS to help educate and inform growers, aims to demonstrate the effective uses of diversified cropping systems.

"What we want to know is what species of aphids lady beetles are eating," Kevin said. He and his peers, like OSU Entomologist Dr. Kris Giles, determine this by using genetic markers that detect the DNA of aphids inside the beetle's gut. So far, six species of cereal aphids can be identified.

Investigating aphids and their predators have allowed us to understand how these insects change and adapt to their environment.

Kevin said he would eventually like to add more genetic markers to those already developed at the Plant and Science Water

See DNA, page 3



Our project is a collaborative effort, teaming the USDA Agricultural Research Service with growers and universities in Texas, Oklahoma, Kansas, Colorado, Nebraska, and Wyoming.

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We welcome suggestions and contributions for future newsletters.

DNA Analysis, continued from Page One

Conservation Laboratory (PSWCRL) in Stillwater. However, his approach would involve other crops than cereals.

He said he would like to identify beetles that have eaten aphid species which feed on crops such as sunflowers or cotton. This would illustrate that these insect predators move to and from cereals and other crops in order to survive.

Of course, the natural enemies are not too far behind the aphids as they move from crop to crop.

"If you diversify a cropping system, you can conserve the natural enemies," he said.



It's one of the good guys!

The parasitic wasp *Lysiphlebus* is the most important biocontrol agent in the battle against the greenbug in wheat. This little guy can be effective in holding greenbug infestations levels that may damage growers financially. Learn more about natural enemies in the Fall 2003 newsletter or See page 4, Points of Interest.

What's Happening Around...

Remote Sensing promotes sensible decisions

Remote sensing provides valuable information for pest management and will be one of the tools that we use for the Areawide wheat program.

Remote sensing helps detect greenbug infestations in wheat fields and helps demonstrate alternatives to costly spraying.

By using green, red, and near infrared light recorded by a specialized digital camera mounted in a fixed wing aircraft, areas of greenbug infested wheat within a field are easily distinguished from healthy wheat.

When viewing the data, there is a strong negative linear relationship between greenbug density in the field and the normalized differenced vegetation index (NDVI) calculated using red and near infrared light. The greenbug infestations are detected by NDVI at densities below typical treatment thresholds.

We can detect greenbug infestations before wheat fields would require insecticide application to

protect the crop from economic losses.

A cereal aphid management decision support system was developed to help growers manage cereal aphids in winter wheat. The system is a set of computer programs maintained online by Oklahoma State University.

The USDA-ARS, Oklahoma State University, and Site Specific Technology Development Group, Inc. developed the system, and

growers can use it free of charge. **See link to website on page 4.**

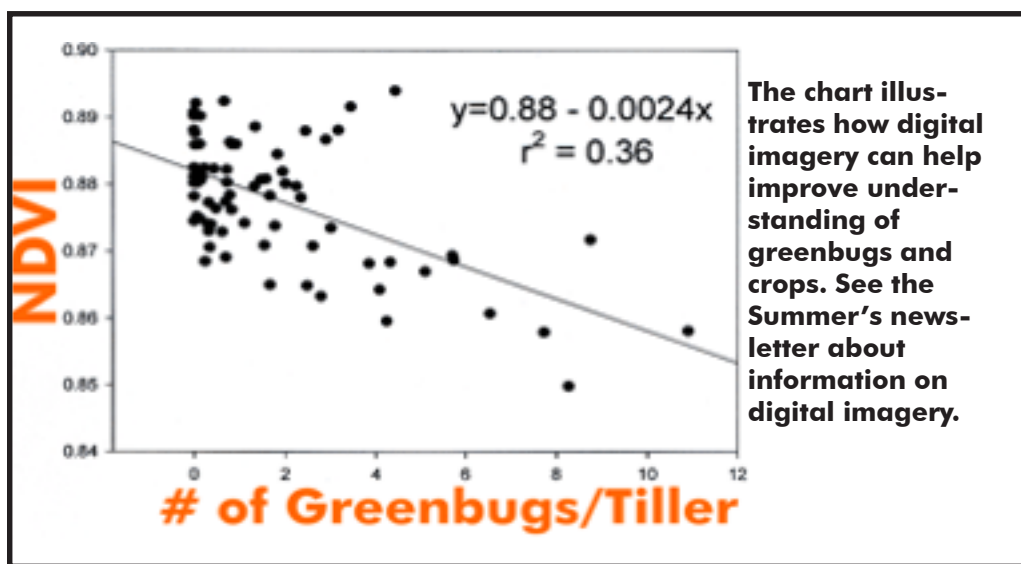
The decision support system has a Greenbug Economic Threshold Calculator that helps the user determine a treatment threshold for greenbugs.

It also allows the user to print Glance 'n Go sampling plans that can be used to sample several fields using a single form. Users calculate treatment thresholds using

weather data to predict growth rates of the greenbug population as well as the price of insecticide treatment and the value of the crop.

The expert system also has modules to help in insecticide selection, cereal aphid identification, and natural enemy identification.

In our summer newsletter, we will tell you more about how Texas A & M uses remote sensing for the AWPM for Wheat project.



Points of Interest



Below are some web links from Oklahoma that may interest growers from all the states:

Find these and other links on our AWPM website!

OSU's Plant Pathology and Entomology Department:

Access: <http://enttop.okstate.edu>

Digital Diagnostics @OSU is an online insect and disease reference manual. Under field crops, you can look up insects and diseases that you may observe in the field. You can even submit your own digital photo for a personalized diagnosis!

The Greenbug Decision Support System provides valuable tools for controlling aphids in wheat (see our article on remote sensing on page 3 for details). From the Entomology homepage, click on the link for "Agricultural models" and then "Cereal Aphids Pest Management."

OSU's Integrated Pest Management provides information about all the IPM teams and programs happening at OSU. From the "Teams" section, you will find links for particular crops including wheat, soybeans, cotton, alfalfa and sorghum.



Other Oklahoma websites:

PEARL provides online viewing and printing of OSU extension publications. In particular, see the list of small grains publications under the Plant and Soil Sciences topic section. You can even learn what the acronym means! Access: <http://pearl.agcomm.okstate.edu>

Oklahoma AgWeather is not only an excellent source of current (and free) weather information but also provides numerous links to soil, crop, livestock and market information. This is an awesome place to learn about current developments in Oklahoma agriculture.

Access: <http://agweather.mesonet.org>

Feature team member, Spring 2003: Oklahoma State University

Dr. Gerrit Cuperus is a Regents Professor of Entomology. His areas of expertise include Integrated Pest Management and extension education.

Dr. Tom Peeper is a Professor of Plant and Soil Sciences and his expertise includes small grain weed science and extension education.

Dr. Kristopher Giles is an Assistant Professor of Entomology. His areas of expertise include host plant resistance and biological control in cropping systems.

Dr. Tom Royer is also an Assistant Professor as well as an extension entomologist. His areas of expertise include Integrated Pest Management in wheat and sorghum.



On the AWPM for Wheat project, **Kris Giles** serves as the demonstration site coordinator in Oklahoma. **Tom Peeper** will conduct weed evaluations for sites in Oklahoma, Kansas and Texas. **Gerrit Cuperus and Tom Royer** will work on education, technology transfer and program evaluation.



Top left to bottom right: Dr. Gerrit Cuperus; Dr. Tom Peeper; Dr. Kris Giles; Dr. Tom Royer



County extension personnel are essential to the AWPM for Wheat program. They have helped us find growers as well as host our focus group discussions. You will find the names

North Central Oklahoma:

Roger Gribble, Northwest area agronomist

Tommy Puffinbarger, Alfalfa County

James Rhodes, Woods County

Jeff Bedwell, Major County

Scott Price, Grant County

Ron Robinson, Garfield County

Bart Cardwell, Kay County

Marty New, Noble County

Southwestern Oklahoma:

Miles Karner, area entomologist

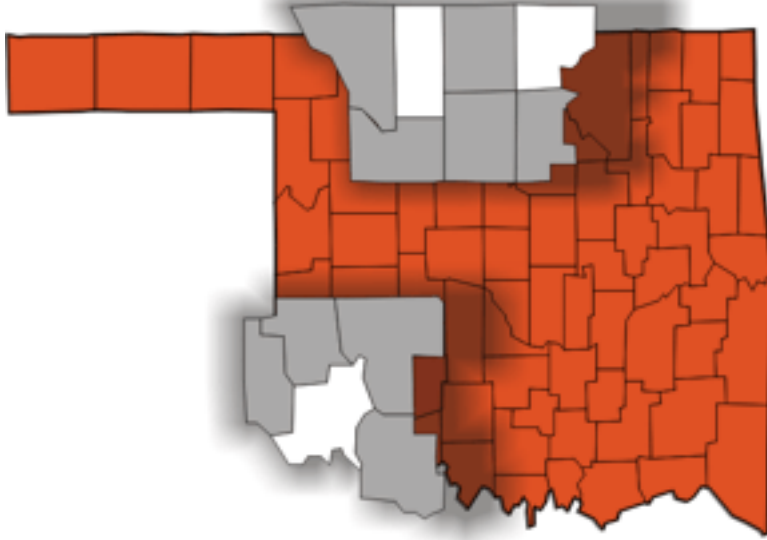
Gary Strickland, Jackson County

Jeff Dill, Greer County

Aaron Henson, Tillman County

Kent Orrell, Kiowa County

Northern Central Oklahoma counties



North Central Oklahoma Counties include Alfalfa, Kay, Major, Woods, Grant and Garfield Counties. Growers from these counties are participating in the AWPM program. The four demonstration sites are divided equally between Kay and Alfalfa Counties.

Southwestern Oklahoma counties

Southwestern Oklahoma Counties include Jackson, Harmon, Tillman, Greer and Kiowa Counties. Both demonstration sites are located in Jackson County.

The greatest IPM tool is information and experience: knowing what problems to expect in your situation and the range of tools at your disposal.

A little bit about... Oklahoma

Oklahoma is ranked second in the United States in winter wheat production. Kansas is #1. Expected yields for dry-land wheat vary with the diverse climate and soil types found in Oklahoma. Soil types also vary in an east to west pattern, with most wheat production occurring in the red soils of the rolling prairies and plains.

In 2001, the state harvested roughly 122 million bushels of winter wheat. Many Oklahoma producers use winter wheat as a “dual crop,” which means the wheat provides forage for cattle in the fall and winter months. In the following summer, it is harvested as a grain crop.

Some Integrated Pest Management tools for Oklahoma wheat include: variety selection, fertility management, planting date, crop rotations, chemical controls and natural (or beneficial) enemies. Crop rotation is one of the key IPM tools. Summer crops rotated with winter wheat in Oklahoma may include grain sorghum, soybeans, corn, cotton or peanuts.

Start checking our website for more information on each region!



Areawide Pest Management for Wheat

Management of greenbug and Russian Wheat Aphid



Agricultural Research Service
1301 N. Western Road
Stillwater, OK 74075
www.pswcrf.ars.usda.gov/awpm.htm

**The AWPM website will
soon have a new look!
Keep an eye out!**

We've thought long and hard...



Far left: Growers attend a focus group meeting in Reno County, Kansas. The information from these focus groups will help AWPM to determine the best way to assist growers. Near left: Carter, son of extension agent Scott Strawn, attended focus group meetings with his father in Ochiltree County, Texas.

In the Summer 2003 Newsletter: Feature team, Texas; Remote sensing and digital imagery; and a focus group update!